

Claims

- [c1] I claim: 1. A method for workpiece movement and positioning comprising the steps of:
- loading the workpiece;
 - moving the workpiece linearly to a predetermined location;
 - stopping the linear movement of the workpiece at the predetermined location;
 - returning the workpiece to its original location;
 - and unloading the workpiece;
- and/or the steps of:
- loading the workpiece;
 - constantly rotating the workpiece;
 - moving the workpiece linearly to a predetermined location;
 - stopping the linear movement of the workpiece at the predetermined location;
 - returning the workpiece to its original location;
 - and unloading the workpiece;
- and/or the steps of:
- loading the workpiece;
 - moving the workpiece linearly to a predetermined location;

stopping the linear movement of the workpiece at the predetermined location;
holding the workpiece in a fixed position for a predetermined period of time;
returning the workpiece to its original location;
and unloading the workpiece;

and/or the steps of:

loading the workpiece;
moving the workpiece linearly to a predetermined location;
stopping the linear movement of the workpiece at the predetermined location;
holding the workpiece in a fixed position for a predetermined period of time;
lowering the workpiece a predetermined distance;
indexing the workpiece by rotating the workpiece a predetermined incremental amount;
raising the workpiece back into position;
holding the workpiece in a fixed position for a predetermined amount of time;
repeating the lowering, indexing, raising and holding steps until the workpiece has been indexed 360 degrees or less as required by the workpiece;
returning the workpiece to its original location;
and unloading the workpiece.

- [c2] 2. The method as set forth in claim 1 [Claim Reference]: including an induction coil and quench means; the step of activating the induction coil and quench means as the workpiece travels linearly to harden the workpiece.
- [c3] 3. The method as set forth in claim 2 [Claim Reference]: including the step of moving the workpiece back through the activated induction coil at a substantially greater speed than the speed of the workpiece during hardening of the workpiece wherein the workpiece is tempered.
- [c4] 4. The method as set forth in claim 1 [Claim Reference]: including an induction coil and quench means; the step of activating the induction coil and quench means while the workpiece is being held in position.
- [c5] 5. The method of claim 1 [Claim Reference]: including any of the means for milling, drilling, welding, assembling, stamping, marking or bending; including the step of activating the means for milling, drilling, welding, assembling, stamping, marking or bending.
- [c6] 6. A workpiece movement and positioning device, the workpiece being located on center with the movement and positioning device, the workpiece movement and positioning device comprising:
a frame for attaching the workpiece movement and

positioning device;
a computer or control mechanism for turning on and off the workpiece movement and positioning device and other components and/or attachments;
an actuator consisting of a ball screw/ball spline assembly with servo motors and a lift shaft for providing the linear and rotational movement of the workpiece such that the workpiece can be caused to move linearly, linear and hold, linearly with rotation, and/or lift and index;
a means for moving the lift shaft linearly without undue bending or flexing;
a means for holding the workpiece in position on the lift shaft;
a manual safety switch to prevent the device from being operated unintentionally.

- [c7] 7. The workpiece movement and positioning device of claim 6 [Claim Reference] further comprising shielding and drain pans to contain any quench fluid and as a safety guard.
- [c8] 8. The workpiece movement and positioning device of claim 7 [Claim Reference] further comprising induction hardening and quenching means wherein the workpiece and hardening means can be operated in either a scan hardening process, a pop up induction hardening pro-

cess and/or a lift and index hardening process.

- [c9] 9. The workpiece movement and positioning device of claim 7 [Claim Reference] further comprising other working tools controlled by the computer to perform work in the workpiece.